



Lessons from the Bay

Wetlands: Here All Year?

What are wetlands, and why are some wet year-round and others only during certain times?

Objectives

Students will

- read about a variety of wetland habitats
- create models of wetland habitats
- compare and contrast various types of wetlands
- conduct an experiment on a schoolyard puddle and collect data at intervals throughout the day
- analyze the data from the puddle experiment to determine weather's effect on the results
- discuss laws that protect wetlands.

Background

A wetland is a transitional area between dry land and a body of water and is wet for all or part of the year. Wetlands' soil is saturated and supports plants that are adapted to wet conditions. Until recently, wetlands were seen as problems to be solved. People tried to fill them with dirt or drain their water so they could be farmed or developed. Now we know that wetlands provide many important benefits; therefore, today there are laws to protect them.

There are many different types of wetland habitats, and they are classified according to the salinity of their water; the duration of water coverage (i.e., all the time, when the tide is in, or during the rainy part of the year); the vegetation they support (grasses, shrubs, or trees); and their sources of water. Sources of water include surface water and groundwater. Surface water includes streams, rivers, ponds, lakes, bays, and oceans. Ground water exists among pieces of soil, sand, and gravel; in cracks in bedrock; and in porous rock such as limestone. Wetlands can be supplied by ground water, and ground water levels can be recharged by wetlands.

Wetlands, such as wet meadows, bogs, swamps, bald cypress-water tupelo tree swamps, pocosins (a special type of shrub wetland), and saltwater and freshwater marshes, cover four percent of Virginia.

Wetlands provide many benefits. They provide habitat for a wide variety of wildlife. Wetlands filter nutrient and sediment pollution out of rain runoff. They hold existing soil in place to prevent erosion.

Related Standards of Learning

Science:

3.1.a; 3.1.e; 3.1.g; 3.1.h; 3.1.i;
3.1.j; 3.6.a; 4.1.b; 4.1.e; 4.1.d;
4.5.d; 4.6.a; 4.6.b; 5.1.b; 5.1.c;
5.1.d; 5.1.e; 5.1.f; 5.4.c; 6.1.c;
6.1.e; 6.1.h; 6.3.b; 6.7.d

Mathematics:

3.12; 3.14.a; 3.15; 3.16; 3.17;
3.21; 3.22; 4.8; 4.11; 4.13; 4.19;
4.20; 5.9; 5.10; 5.18; 6.9; 6.10;
6.11; 6.12; 6.18

English:

3.1; 3.4; 3.7; 3.8; 4.1; 4.3; 5.1;
5.4; 5.7; 6.3

History and Social Science:

3.10; VS.1.b; VS.1.d; VS.1.h

Time Required

Two 45-minute sessions and one session broken up over the course of a day

Materials

- several copies of each of the six wetland information sheets on pp. 79–84 of U.S. Fish and Wildlife Service's Schoolyard Habitat Project Guide (see Resources)
- 1 or more watches
- 1 or more Celsius thermometers
- 1 or more meter sticks
- calculators, for 5th grade option
- sponge, shallow dish just larger than the sponge, and water

For each student:

- graph paper
- Puddle Lab Sheet (handout, page 25)

For each group:

- box and a variety of art supplies to make a diorama
- piece of clear or blue tinted plastic wrap and clear tape

Wetlands soak up water and moderate water flow, thereby reducing flooding.

Procedures

Session 1 (45 minutes)

Conduct this session in the classroom.

1. Place the sponge in the shallow dish. Pour water into the dish, and ask students what is happening to the water. Compare the sponge to a wetland, explaining that soil in a wetland soaks up water just as the sponge does. Provide students with a general description of wetlands based on the information in the lesson Background. Include in the description the fact that a wetland may be covered by a shallow layer of water but is not deep enough to be called a pond or lake. Explain that some wetlands are wet all the time and others only part of the time.
 2. Divide the class into six groups. Each group will be studying one type of wetland: bog, freshwater marsh, saltwater marsh, wet meadow, shrub wetland, and tree swamp. Provide each group with several copies of the information sheet on their assigned wetland.
 3. Explain that as they read about their wetland, students should take notes on the amount and kind of water (fresh, salt, or brackish) in their wetland. *Is it wet all the time? If only some of the time, when?* Students should also list plants and animals that can be found in their wetland. Each group will use this information to create a diorama of their wetland.
 4. When groups have finished taking notes, they will begin preparations for their dioramas. Make available wildlife guides on birds, insects, mammals, reptiles, amphibians, trees, and wildflowers, and instruct students to draw the plants and animals found in the wetland. (Drawings will be cut out and placed in the dioramas, so they should be small enough to fit in the boxes.) Tell students to write a number on each plant type and a letter on each animal type. The dioramas will be assembled in Session 2 of the lesson.
- Art paper and other materials may be used to line the box and represent the wetland environment.
 - Plastic wrap may be taped inside the box to represent the water on the surface of the wetland.
 - Drawings of plants and animals should be attached throughout the scene.
2. Next, direct students to make a key to the scene on a strip of construction paper. The key will provide information about the water, plants, and animals in the wetland and should be attached to the top of the diorama. Tell students to include in the key:
 - wetland type
 - brief description, including the kind of water and whether it is present in the wetland all the time or only part of the time
 - list of numbers and letters together with the names of the plants and animals to which they correspond.
 3. When all the groups have finished, allow time for students to view all the dioramas. Discuss the similarities and differences among the various types of wetlands. Ask what might cause a wetland to have water only some of the time. In tidal wetlands, water may come and go daily. Others may be affected by weather and contain water only when rain is plentiful. Ask how drought or especially hot or windy weather might affect water levels. This will provide an opportunity to talk about evaporation.
 4. Finally, explain some of the benefits of wetlands as detailed in the lesson Background. Also, briefly discuss laws protecting wetlands and what might happen if the laws did not exist or were not obeyed.

Session 3 (45 minutes broken up over the course of a day)

Conduct this session in the schoolyard.

1. Provide each student with a copy of the Puddle Lab Sheet. Choose one of several options when organizing the class for the experiment. One option is to use a single puddle and let different students gather data at different times of the day. Another option is to use several puddles and assign a group of students to each puddle. The experiment may be performed on puddles created by rainfall or by water from a hose. For each puddle, the class will need a watch,

Session 2 (45 minutes)

Conduct this session in the classroom.

1. Direct each group to turn their open box on its side, and provide students with suggestions for constructing the diorama.

a Celsius thermometer, and a meter stick.

2. Read aloud the question on the lab sheet and instruct students to write their hypotheses. Review methods of taking temperature, measuring in centimeters, and telling time. Relate the importance of measuring the width of the puddle in the same direction each time.
3. Collect data several times during the day, as your schedule allows.
4. After collecting data, provide time for students to draw graphs and write conclusions. (See “Preparing Graphs and Charts” on page 69 of the **Project Action Guide**.) Instruct students to draw a bar graph or line graph showing the time elapsed on the x-axis and the width of the puddle on the y-axis.

Option for advanced students:

Direct students to draw their graphs to illustrate the change in area, rather than width, over time. Students will use the width of the puddle as an approximate diameter (as long as the puddle is approximately a circle). They will divide the diameter by 2 to find the radius and use it in the formula for the area of a circle.

5. When students have finished, discuss how the graphs illustrate evaporation of water and how the experiment relates to wetlands that are wet during only part of the year.

Resources

“Capture, Store and Release.” Project WET. The Watercourse, 1995. (See <<http://www.projectwet.org/watercourse>>.)

Chesapeake Bay Foundation. “Wetland Clues.” *Watershed Action for Virginia’s Environment (WAVE)*. (See <http://www.cbf.org/site/PageServer?pagename=edu_educators_curriculum_va_index>, or contact the Virginia Office: Capitol Place, 1108 E. Main Street, Suite 1600, Richmond, VA 23219; phone 804-780-1392.)

Chesapeake Bay Foundation. “Wetland Work!” *Watershed Action for Virginia’s Environment (WAVE)*. (See <http://www.cbf.org/site/PageServer?pagename=edu_educators_curriculum_va_index>, or contact the Virginia Office: Capitol Place, 1108 E. Main Street, Suite 1600, Richmond, VA 23219; phone 804-780-1392.)

Levathes, Louise E. “Mysteries of the Bog.” *National Geographic* March 1987: 397–420.

“Life in the Fast Lane.” Project WET. The Watercourse, 1995. (See <<http://www.projectwet.org/watercourse>>.)

Mitchell, John G. “Our Disappearing Wetlands.” *National Geographic* October 1992: 3–45.

“Preparing Graphs and Charts.” Project Action Guide. *Lessons from the Bay*. 69–70.

Classroom Assessment Suggestions

- Dioramas include most of the plants and animals from the wetland information sheet and are labeled correctly.
- Diorama key correctly describes the type and amount of water in the wetland throughout the day and year.
- Measurement and recording of time, temperature, and distance in puddle experiment are accurate.
- Graph of puddle experiment is clearly labeled and data are correctly plotted.

Extensions for Students

- Research local, state, and federal laws and regulations that protect wetlands. (See “Using the Library Media Center for Project Research” and “Using the World Wide Web for Project Research” on pages 55–58 of the **Project Action Guide**.)
- Repeat the puddle experiment on another day, choosing a variety of puddles in locations different from those in the earlier experiment (e.g., on the blacktop, in the grass, in a shaded spot). See how evaporation rates vary among puddles and from those recorded in the earlier experiment.
- Take a field trip to a local wetland and look for plants or animals your class has studied.

Silver, Donald M., Patricia J. Wynne. *Swamp*. One Small Square. New York: McGraw-Hill, 1997. ISBN 0070579261.

Sisson, R. “Tide Pools: Windows Between Land and Sea.” *National Geographic* February 1986: 252-259.

United States. Dept. of Agriculture. Forest Service. “Forested Wetlands.”
<http://www.na.fs.fed.us/spfo/pubs/n_resource/wetlands/>.

United States. Dept. of the Interior. U.S. Fish and Wildlife Service. “Chesapeake Wetlands” fact sheet. (Contact Chesapeake Bay Estuary Service: 180 Admiral Cochrane Drive, Suite 535, Annapolis, MD 21401; phone 310-224-2732.)

United States. Dept. of the Interior. U.S. Fish and Wildlife Service. *Schoolyard Habitat Project Guide*. <<http://www.fws.gov/r5cbfo/habitatguide.pdf>>. 79–84. (For more information about the Schoolyard Habitat program, see <<http://www.fws.gov/r5cbfo/schoolyd.htm>>.)

“Using the Library Media Center for Project Research.” Project Action Guide. *Lessons from the Bay*. 55–56.

“Using the World Wide Web for Project Research.” Project Action Guide. *Lessons from the Bay*. 57–58.

Virginia. Dept. of Conservation and Recreation. “Natural Heritage Resources Fact Sheet.”
<<http://www.dcr.state.va.us/dnh/fsaevi.pdf>>.

“Watch on Wetlands.” *Environmental Education Activity Guide*. Project Learning Tree. Washington, D.C.: American Forest Foundation, 1995. (See <<http://www.plt.org/curriculum/k-8guide.cfm>>.)

Wetlands. Videocassette. Bill Nye the Science Guy Complete Series. Disney Educational Productions, 1996. (See <<http://dep.disney.go.com/educational/index>>.)

“Wetlands: Water, Wildlife, Plants & People.” Poster. Water Resources Outreach Program. U.S. Geological Survey. (See <<http://water.usgs.gov/outreach/OutReach.html>>.)

Wetlands Work for the Chesapeake Bay. Videocassette. Chesapeake Bay Foundation. (See <<http://www.cbf.org>>.)